

C L A I M S

1. A microfluidic device comprising a set of one or more, preferably more than 5, covered microchannel structures manufactured in the surface of a planar substrate,
5 **characterized** in that a part surface of at least one of the microchannel structures has a coat exposing a non-ionic hydrophilic polymer that preferably is attached covalently directly to the surface or to a polymer skeleton that is attached to the surface.
- 10 2. The microfluidic device of claim 1, **characterized** in that the surface of the planar substrate is made of plastics.
3. The microfluidic device according to any of claims 1-2,
15 **characterized** in that the non-ionic hydrophilic polymer is attached to the polymer skeleton that is attached to the part surface, said skeleton preferably being branched and/or preferably being a polyamine.
- 20 4. The microfluidic device according to any of claims 1-3, **characterized** in that the substrate surface without the coat is made of plastics and that said part surface without coat is hydrophilized by plasma treatment or by an oxidation agent in order to introduce functional groups that allow for
25 a subsequent attachment of the coat onto said part surface.
5. The microfluidic device according to any of claims 1-4, **characterized** in that the non-ionic hydrophilic polymer comprises one or more blocks of polyoxyethylene chains, with
30 preference for the polymer being polyethylene glycol covalently attached at one of its ends to the skeleton or directly to the part surface and possibly having the remaining hydroxy group etherified.

6. The microfluidic device according to any of claims 1-6,
characterized in that the hydrophilic non-ionic polymer is a
polyethylene glycol, preferably a monoalkoxy variant such as
the monomethoxy variant, which is attached to said part
5 surface via the polymer skeleton which preferably is a
polyethylenimine.
7. The microfluidic device according to any of claims 1-6,
characterized in that the hydrophilic non-ionic polymer is
10 attached to said part surface or to said polymer skeleton
via one-point attachment, preferably covalently.
8. The microfluidic device according to any of claims 2-7,
characterized in that the plastics has a non-significant
15 fluorescence for excitation wavelengths in the interval 200-
800 nm and emission wavelengths in the interval 400-900 nm.
9. The microfluidic device according to any of claims 1-3 and
5-8, **characterized** in that said polymer skeleton is an
20 inorganic or an organic polymer.
10. The microfluidic device according to any of claims 1-
4 and 7-9, **characterized** in that said non-ionic hydrophilic
polymer comprises a plurality of amide bonds, e.g. is
25 polymerisate/copolymerisate with monomers at least selected
from acrylamide, methacrylamide, vinylpyrrolidone etc.
11. The microfluidic device according to any of claims 1-
10, **characterized** in that it is in a dried state that is
30 capable of being rehydrated.
12. The use of the microfluidic device according to any
of claims 1-11 in analytical systems in which an assay
comprising one or more of the steps:
- 35 (a) sample preparation,

